REMARKS

Applicant is in receipt of the Office Action mailed October 23, 2002.

Claims 2, 4, 13, 15, 24, and 26 have been canceled. Claims 1, 3, 5-9, 12, 14, 16-19, 23, 25, and 27-30 have been amended. Thus, claims 1, 3, 5-12, 14, 16-23, 25, and 27-33 are currently pending. Further examination and reconsideration of the presently claimed application is respectfully requested in light of the following remarks.

Section 103 Rejections

Claims 1-4, 8-15, 19-21, 23-26, and 30-32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,628,468 to Thompson et al. ("Thompson") in view of U.S. Patent No. 6,351,662 to Franck et al ("Franck") and U.S. Patent No. 6,244,510 to Ring et al. ("Ring"). Claims 2, 4, 13, 15, 24, and 26 were canceled. As will be set forth in more detail below, removal of the § 103(a) rejection of claims 1, 3, 8-12, and 14, 19-21, 23, 25, and 30-32 is respectfully requested.

To establish a *prima facie* obviousness of a claimed invention, *all claim limitations* must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974), MPEP 2143.03. Obviousness cannot be established by combining or modifying the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion or incentive to do so. *In re Bond,* 910 F. 2d 81, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990). The cited art, singly or in combination, does not teach or suggest all limitations of the currently pending claims, some distinctive limitations of which are set forth in more detail below.

Amended Claim 1 recites:

1. (Amended) A method for scanning for an object within a region, comprising:

scanning the region using a conformal scanning scheme, said scanning comprising:

performing a conformal mapping between a characteristic geometry of the region and a first scanning curve to generate a conformal scanning curve based on said characteristic geometry; and

measuring the region at a plurality of points along the conformal scanning curve;

determining one or more characteristics of the object in response to said scanning; and

generating output indicating the one or more characteristics of the object.

The cited art does not teach or suggest scanning the region using a conformal scanning scheme. As is well known in the art, the term "conformal" refers to the property of preserving angles between corresponding curves. As Applicants state (Page 33, paragraph 3):

"A mapping $w = f(z)$ defined on a region D that is part of the complex plane is said to be angle preserving, or conformal, at z_0 if it preserves angles between oriented curves in magnitude as well as in orientation. If f is a conformal mapping then orthogonal curves are mapped onto orthogonal curves."

Thus, a conformal transform may be used to map a first curve to a second curve while preserving angles. Applicants are unclear as to what is meant by the statement in the Office Action regarding the system disclosed by Thompson that "the microscope lens mounting are conformal type."

Thompson discloses a system and method for determining pore-dependent properties of a microporous solid by measurement pore microstructure (Col. 1, lines 8-10). While Thompson does describe "scanning the surface of a sample of the solid with a microscope operated at a first selected magnification to generate a microscope output signal indicative of geometric features of the sample intersecting a path on the surface" (Col. 17, lines 43-47), nowhere does Thompson teach or suggest *scanning the region using a conformal scanning scheme*, and more specifically, Thompson neither teaches nor suggests *performing a conformal mapping between a characteristic geometry of the*

region and a first scanning curve to generate a conformal scanning curve based on said characteristic geometry; and measuring the region at a plurality of points along the conformal scanning curve. Applicants respectfully suggest that, while scanning itself is well-known in the art, scanning a region using a conformal scanning scheme is both novel and useful.

The Office Action further cites the systems of Franck and Ring, asserting that "it would have been obvious to one of ordinary skill in the art ... to modify Thompson to have the geometry mapping and application with subset of points and data as taught by Franck and Ring in order to determine the exact location in one, two and three dimensional space coordinate system and be able to rotate with the scan while improving viewing angles and increase scanning accuracy and reliability."

Applicants respectfully disagree. Applicants note that Franck teaches "a method for determining a mapping between coordinates relative to a body and corresponding coordinates in a three-dimensional image of the body in stereotactic surgery." (Abstract, first sentence). More specifically, Franck describes attaching an anchored pointing device to an object, such as a human head or body, scanning the object, including scanning markers affixed to the object, to generate a three dimensional image of the object, then using an articulated arm anchored to the object to determine respective locations and orientations of the scanning markers in the image. The scanning marker positions/orientations on the object and the scanning marker positions/orientations in the image are then used to compute a conformal mapping between the object and the image. Thus, the system and method of Franck scans the object in order to compute a conformal map. In other words, in the system and method taught by Franck, the conformal map is *not* used to generate a scanning path.

Additionally, the Franck system relates to the determination of a conformal mapping based on scanned points and the resulting image points. Franck neither teaches nor suggests using a conformal map to transform a scan path to a conformal scan curve based on a characteristic geometry of the object.

Applicants note that Ring teaches "an improved, rotatably articu[l]able scanner for reading and decoding bar codes in connection with the sale of retail articles" (Abstract, first sentence). More specifically, Ring describes a data reading device (bar

code scanner) that uses a laser light source and motorized scanning mirror mechanism to scan a bar code. Applicants further note that while Ring refers to various "conformal" physical parts of the data reading device, e.g., conformal teeth, conformal splines, etc., no mention is made of conformal mapping or of conformal scanning. Thus, Ring neither teaches nor suggests *scanning a region using a conformal mapping scheme*, and more specifically neither teaches nor suggests *performing a conformal mapping between a characteristic geometry of the region and a first scanning curve to generate a conformal scanning curve based on said characteristic geometry; and measuring the region at a plurality of points along the conformal scanning curve.*

Thus, not only does the cited art (Thompson, Franck, and Ring) not teach or suggest using a conformal scanning scheme, but there is no teaching, suggestion, or motivation to combine the art to teach this limitation. Thompson specifically teaches scanning an object with a microscope, with no mention or reference to a conformal scanning scheme. Therefore, there is no motivation within Thompson to scan the region using a conformal scanning scheme. Furthermore, there is no discussion or motivation within Franck to scan the region based on a conformal scanning scheme. Finally, there is no discussion or motivation within Ring to scan the region based on a conformal scanning scheme. Therefore, the cited art cannot be combined to teach the limitations of the presently claimed case.

For at least the reasons cited above, claim 1 is asserted to be patentably distinct from the cited art. Claims 3, and 5-11 are dependent from claim 1, and therefore claims 3, and 5-11 are patentably distinct over the cited art for at least the same reasons as that claim. Accordingly, removal of the § 103(a) rejection of claims 1, 3, and 5-11 is respectfully requested.

Claims 12 and 23 include similar limitations to claim 1, and therefore, the above arguments similarly apply. Thus, for at least the reasons given above, claims 12 and 23 are asserted to be patentably distinct from the cited art. Claims 14, 16-22 are dependent from claim 12, and claims 25, and 27-33 are dependent from claim 23, and therefore claims 14, 16-22 and claims 25, and 27-33 are patentably distinct over the cited art for at least the same reasons as those claims.

Dependent claims 22 and 33 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Thompson, Frank, and Ring, in view of Sakamoto (U.S. Patent 4,511,989). Applicants respectfully disagree. As described above, neither Thompson, Frank, nor Ring teaches or suggests *scanning the region using a conformal scanning scheme.* Applicants further note that Sakamoto teaches a linear interpolation method for signals used in a color picture processing machine, and makes no reference to *scanning the region using a conformal scanning scheme.* While Sakamoto does disclose a four-dimensional interpolation unit space (Abstract), no mention is made of a scanning region *wherein the region has a dimensionality greater than three.* In other words, the four-dimensional interpolation unit space of Sakamoto is unrelated to the scanning region of *dimensionality greater than three*, as claimed by Applicants.

Thus, Applicants respectfully submit that neither Thompson, Frank, Ring, nor Sakamoto, either singly or in combination, teaches or suggests the limitations of claims 22 and 33.

Thus, for at least the reasons given above, claims 22 and 33 are asserted to be patentably distinct from the cited art, and removal of the § 103(a) rejection of claims 22 and 33 is respectfully requested.

Dependent claims 5, 16, and 27 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Thompson, Frank, Ring, and Sakamoto in view of Walsh, et al. (U.S. Patent 4,231,661) ("Walsh). Applicants respectfully disagree. As noted above, neither Thompson, Frank, Ring, nor Sakamoto teaches nor suggests *scanning the region using a conformal scanning scheme.* Furthermore, neither Thompson, Frank, Ring, nor Sakamoto teaches nor suggests a method of scanning *wherein the first scanning curve minimizes one or more of angle deviations and curvature.* Applicants further note that Walsh discloses a radial scanner, and makes no reference to *scanning the region using a conformal scanning scheme.* Nor does the system of Walsh include the limitation that *the first scanning curve minimizes one or more of angle deviations and curvature.* Rather, in the system of Walsh, "the dimensions and orientations of the elements of the scanner may be selected to minimize deviation of the incident beam from a target point", i.e., the

system of Walsh minimizes *deviation of the incident beam*, as opposed to minimizing angle deviations and/or curvature of the scanning curve. Thus, Applicants respectfully submit that neither Thompson, Frank, Ring, Sakamoto nor Walsh, either singly or in combination, teaches or suggests the limitations of claims 5, 16, and 27. Thus, for at least the reasons given above, claims 5, 16, and 27 are asserted to be patentably distinct from the cited art, and removal of the § 103(a) rejection of claims 5, 16, and 27 is respectfully requested.

Finally, dependent claims 6, 7, 17, 18, 28, and 29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Thompson, Frank, Ring, Sakamoto and Walsh, in view of Toraichi (U.S. Patent 5,572,605). Applicants respectfully disagree. As noted above, Thompson neither teaches nor suggests *scanning the region using a conformal scanning scheme*. Further, neither Thompson, Frank, Ring, Sakamoto nor Walsh teaches or suggests a method of scanning *wherein the conformal curve has a maximum curvature below a specified curvature value*, nor *wherein the first scanning curve is an optimum scanning curve for a first geometry*. Applicants further note that Toraichi teaches a system and method for inputting, compressing and outputting characters, illustrations, drawings and logomarks, and makes no reference to *scanning the region using a conformal scanning scheme*. Additionally, the system or method of Toraichi specifically does not include the limitation that *the conformal curve has a maximum curvature below a specified curvature value*. Neither does the system or method of Toraichi include the limitation that *the first scanning curve is an optimum scanning curve for a first geometry*. Thus, Applicants respectfully submit that neither Thompson, Frank, Ring, Sakamoto, Walsh, nor Toraichi, either singly or in combination, teaches or suggests the limitations of claims 6, 7, 17, 18, 28, and 29. Thus, for at least the reasons given above, claims 6, 7, 17, 18, 28, and 29 are asserted to be patentably distinct from the cited art, and removal of the § 103(a) rejection of claims 6, 7, 17, 18, 28, and 29 is respectfully requested.

Thus, for at least the reasons given above, removal of the § 103(a) rejection of claims 1, 3, 5-12, 14, 16-23, 25, and 27-33 is respectfully requested.

CONCLUSION

In this response, claims 2, 4, 13, 15, 24, and 26 have been canceled. Claims 1, 3, 5-9, 12, 14, 16-19, 23, 25, and 27-30 have been amended. Thus, claims 1, 3, 5-12, 14, 16-23, 25, and 27-33 are currently pending. Rejection of claims 1, 3, 5-12, 14, 16-23, 25, and 27-33 under 35 U.S.C. § 103(a) have been responded to. This response, therefore, constitutes a complete response to all issues raised in the Office Action mailed October 23, 2002. In view of the remarks traversing the rejections presented in the Office Action, pending claims 1, 3, 5-12, 14, 16-23, 25, and 27-33 are in condition for allowance.

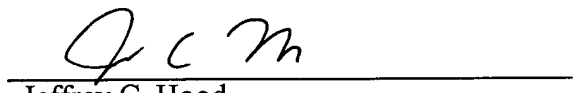
Applicants submit the application is in condition for allowance, and an early notice to that effect is requested.

If any extensions of time (under 37 C.F.R. § 1.136) are necessary to prevent the above referenced application(s) from becoming abandoned, Applicant(s) hereby petition for such extensions. If any fees are due, the Commissioner is authorized to charge said fees to Meyertons, Hood, Kivlin, Kowert & Goetzel PC Deposit Account No. 50-1505/5150-53101/JCH.

Also enclosed herewith are the following items:

☒ Return Receipt Postcard

Respectfully submitted,



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Date: February 14, 2003

Attachment A of the Response to Office Action Dated October 23, 2002

Claims 2, 4, 13, 15, 24, and 26 have been canceled and claims 1, 12, and 23 have been amended as follows:

1. (Amended) A method for scanning for an object within a region, comprising:

scanning the region using a conformal scanning scheme, said scanning comprising:

performing a conformal mapping between a characteristic geometry of the region and a first scanning curve to generate a conformal scanning curve based on said characteristic geometry; and

measuring the region at a plurality of points along the conformal scanning curve;

determining one or more characteristics of the object in response to said scanning; and

generating output indicating the one or more characteristics of the object.

2. (Canceled)

3. (Amended) The method of claim [2]1, further comprising:

determining the characteristic geometry of the region prior to said generating the conformal scanning curve.

4. (Canceled)

5. (Amended) The method of claim [4]1, wherein the first scanning curve minimizes one or more of angle deviations and curvature.

6. (Amended) The method of claim [4]1, wherein the conformal curve has a maximum curvature below a specified curvature value.

7. (Amended) The method of claim [4]1, wherein the first scanning curve is an optimum scanning curve for a first geometry.

8. (Amended) The method of claim [4]1, wherein the first scanning curve is comprised in a first geometry, wherein the first scanning curve comprises a subset of points in said first geometry, and wherein said performing a conformal mapping between said characteristic geometry and said first scanning curve comprises:

determining a mapping function which maps each point in the first geometry to a corresponding point in the characteristic geometry; and

applying said mapping function to each point in said subset of points in said first geometry to generate a corresponding subset of points in said characteristic geometry, wherein said subset of points in said characteristic geometry comprises said conformal scanning curve.

9. (Amended) The method of claim [2]1,

wherein said measuring the region at a plurality of points along the conformal scanning curve produces data;

wherein said determining one or more characteristics of the object in response to said scanning comprises examining said data.

12. (Amended) A system for scanning for an object within a region, comprising:

a sensor; and

a computer which is operable to couple to said sensor, said computer comprising:

a CPU; and

a memory medium which is operable to store a scanning program;

wherein said CPU is operable to execute said scanning program to perform:

scanning the region with said sensor using a conformal scanning scheme, said scanning comprising:

performing a conformal mapping between a characteristic geometry of the region and a first scanning curve to generate a conformal scanning curve based on said characteristic geometry; and

measuring the region at a plurality of points along the conformal scanning curve;

determining one or more characteristics of the object in response to said scanning; and

generating output indicating the one or more characteristics of the object.

13. (Canceled)

14. (Amended) The system of claim [13]12, wherein said CPU is further operable to execute said scanning program to perform:

determining the characteristic geometry of the region prior to said generating the conformal scanning curve.

15. (Canceled)

16. (Amended) The system of claim [15]12, wherein the first scanning curve minimizes angle deviations.

17. (Amended) The system of claim [15]12, wherein the conformal curve has a maximum curvature below a specified curvature value.

18. (Amended) The system of claim [15]12, wherein the first scanning curve is an optimum scanning curve for a first geometry.

19. (Amended) The system of claim [13]12,

wherein said measuring the region at a plurality of points along the conformal scanning curve produces data; and

wherein said determining one or more characteristics of the object in response to said scanning comprises examining said data.

23. (Amended) A memory medium containing program instructions to scan for an object within a region, wherein said program instructions are executable to perform:

scanning the region using a conformal scanning scheme;

determining one or more characteristics of the object in response to said scanning; and

generating output indicating the one or more characteristics of the object.

24. (Canceled)

25. (Amended) The memory medium of claim [24]23, wherein said program instructions are further executable to perform:

determining the characteristic geometry of the region prior to said generating the conformal scanning curve.

26. (Canceled)

27. (Amended) The memory medium of claim [26]23, wherein the first scanning curve minimizes angle deviations.

28. (Amended) The memory medium of claim [26]23, wherein the conformal curve has a maximum curvature below a specified curvature value.

29. (Amended) The memory medium of claim [26]23, wherein the first scanning curve is an optimum scanning curve for a first geometry.

30. (Amended) The memory medium of claim [24]23,

wherein said measuring the region at a plurality of points along the conformal scanning curve produces data; and

wherein said determining one or more characteristics of the object in response to said scanning comprises examining said data.